



# GOOGLE COLAB

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# GOOGLE COLAB



google colab - Google Search

https://www.google.com/search?q=google+colab&oeq=google+colab&aqs=chrome..69i57j69i60l2j69i59l3.2367j0j7&sourceid=chrome&ie=UTF-8

google colab

All News Images Videos Books More Settings Tools

About 3,47,00,000 results (0.29 seconds)

### Welcome To Colaboratory - Colaboratory - Google

<https://colab.research.google.com/>

These are a few of the notebooks from Google's online Machine Learning course. See the full course website for more. Intro to Pandas · Tensorflow concepts ...

You've visited this page 2 times. Last visit: 25/2/19

#### Google Colaboratory

Colaboratory is a free Jupyter notebook environment that ...

#### TensorFlow with GPU

Confirm TensorFlow can see the GPU. Simply select "GPU" in the ...

#### Run in Google Colab

View on TensorFlow.org, Run in Google Colab, View source on ...

[More results from google.com »](#)

#### Colaboratory – Google

What is Colaboratory? Colaboratory is a research tool ...

#### Local files, Drive, Sheets ...

This notebook provides recipes for loading and saving data from ...

#### Importing libraries

Importing a library that is not in Colaboratory. To import a library ...

Google Col  
Laboratory is a research setup to use.  
Seattle, WA https:  
Google A

deep\_learning\_turkey.ipynb  
File Edit View Insert Runtime Tools H  
CODE TEXT CELL CELL

More images

## Google collaboration

**Google Colab** is a free cloud service and now it supports free GPU! You can: improve your Python programming

# GOOGLE COLAB



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Welcome To Colaboratory

File Edit View Insert Runtime Tools Help

CODE TEXT CELL CELL COPY TO DRIVE

CONNECT EDITING

Table of contents Code snippets Files

Introducing Colaboratory

Getting Started

More Resources

Machine Learning Examples: Seedbank

SECTION

CO

Welcome to Colaboratory!

Colaboratory is a free Jupyter notebook environment that requires no setup and runs entirely in the cloud. With Colaboratory you can write and execute code, save and share your analyses, and access powerful computing resources, all for free from your browser.

Introducing Colaboratory

This 3-minute video gives an overview of the key features of Colaboratory:

Get started with Google Colaboratory (Coding...)

Watch later Share

Intro to Google Colab

Play button

Coding TensorFlow

# GOOGLE COLAB



The screenshot displays the Google Colaboratory web interface. The browser address bar shows the URL `https://colab.research.google.com/notebooks/welcome.ipynb#scrollTo=5FCEDCU_qrC0`. The page title is "Welcome To Colaboratory". The "File" menu is open, showing options such as "New Python 3 notebook", "New Python 2 notebook", "Open notebook...", "Upload notebook...", "Rename...", "Move to trash", "Save a copy in Drive...", "Save a copy as a GitHub Gist...", "Save a copy in GitHub...", "Save", "Save and pin revision", "Revision history", "Download .ipynb", "Download .py", and "Update Drive preview". The main content area features a large heading "Welcome to Colaboratory!" and a paragraph explaining that it is a free Jupyter notebook environment. Below this, there is a section titled "Introducing Colaboratory" with a video player showing a video titled "Get started with Google Colaboratory (Coding...)". The video player includes controls for "Watch later" and "Share".

Welcome To Colaboratory

File Edit View Insert Runtime Tools Help

New Python 3 notebook

New Python 2 notebook

Open notebook... Ctrl+O

Upload notebook...

Rename...

Move to trash

Save a copy in Drive...

Save a copy as a GitHub Gist...

Save a copy in GitHub...

Save Ctrl+S

Save and pin revision Ctrl+M S

Revision history

Download .ipynb

Download .py

Update Drive preview

CONNECT EDITING

## Welcome to Colaboratory!

Colaboratory is a free Jupyter notebook environment that requires no setup and runs entirely in the cloud.

In Colaboratory you can write and execute code, save and share your analyses, and access powerful computing resources, all for free from your browser.

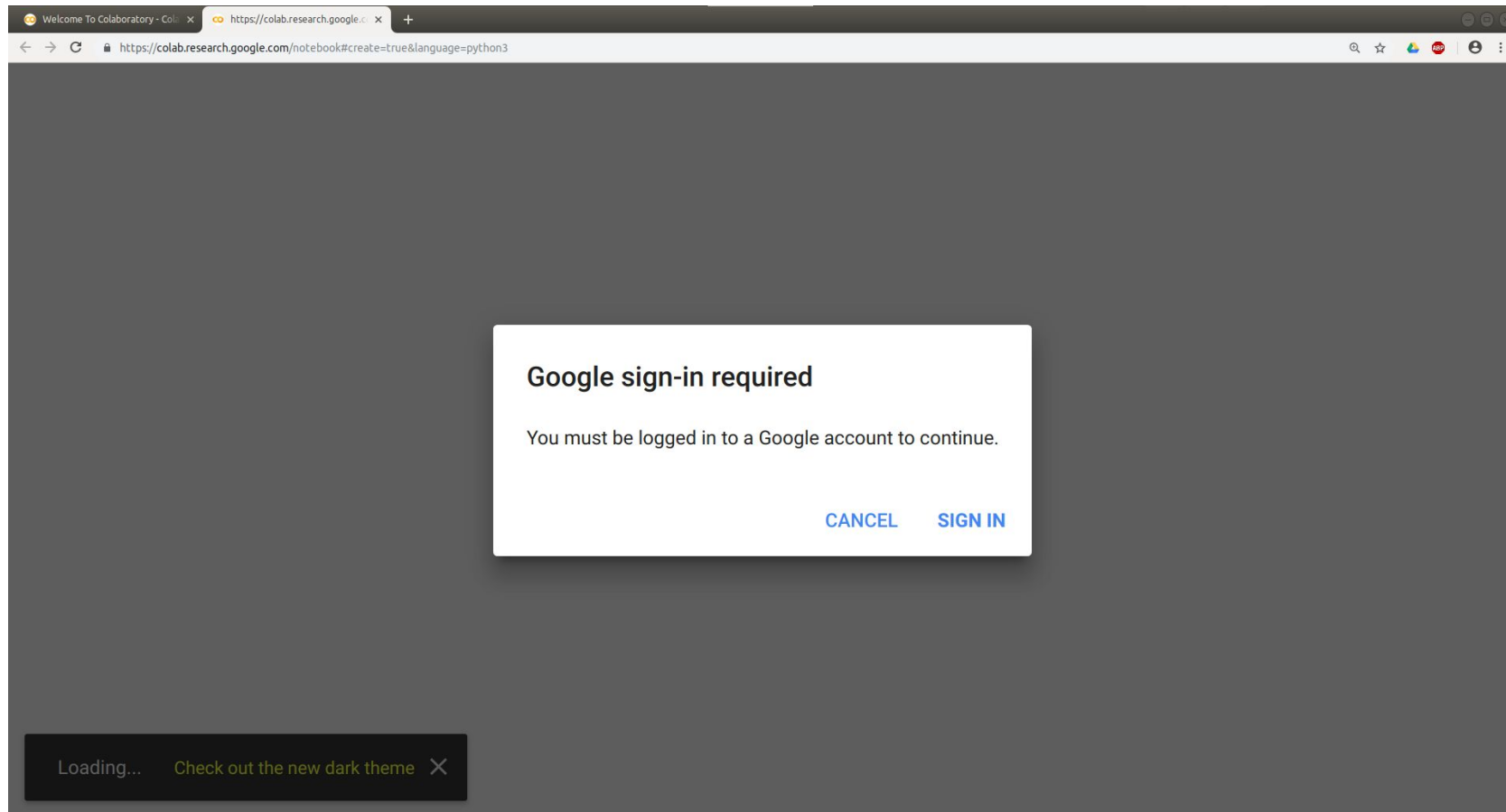
### Introducing Colaboratory

This 3-minute video gives an overview of the key features of Colaboratory:

Get started with Google Colaboratory (Coding...)

Watch later Share

## Intro to Google Colab



# GOOGLE COLAB



The screenshot displays the Google Colab web interface in a browser. The address bar shows the URL <https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V>. The main header features the Colab logo, the notebook title "Untitled1.ipynb" with a red arrow pointing to it, and a menu bar with options: File, Edit, View, Insert, Runtime, Tools, and Help. On the right side of the header are buttons for COMMENT, SHARE, and a small tree icon. Below the header is a toolbar with tabs for CODE, TEXT, and CELL (with up and down arrows), and buttons for CONNECT, EDITING, and a collapse icon. The main workspace contains a single code cell with a play button icon on the left and a three-dot menu icon on the right.

# GOOGLE COLAB



Browser tabs: Welcome To Colaboratory - Colab, Test\_HelloWorld.ipynb - Colab

Address bar: <https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V>

Page title: Test\_HelloWorld.ipynb ☆

Menu: File Edit View Insert Runtime Tools Help

Actions: COMMENT SHARE

Toolbar: + CODE + TEXT ↑ CELL ↓ CELL CONNECT EDITING

Code cell: [Play button] [Empty code input area]

# GOOGLE COLAB



Google Colaboratory interface showing a notebook titled "Test\_HelloWorld.ipynb". The browser address bar displays the URL: <https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V>.

The interface includes a top navigation bar with the Google Colab logo, the notebook title "Test\_HelloWorld.ipynb", and a star icon. Below the title is a menu bar with options: File, Edit, View, Insert, Runtime, Tools, and Help.

The main toolbar contains buttons for adding new elements: CODE, TEXT, and CELL (with up and down arrows). A red arrow points to the "CONNECT" button, which is highlighted. To the right of "CONNECT" is the "EDITING" button.

The notebook content area shows a single code cell with a play button icon on the left and a three-dot menu icon on the right.



# GOOGLE COLAB



Browser tabs: Welcome To Colaboratory - Colab, Test\_HelloWorld.ipynb - Colab

Address bar: <https://colab.research.google.com/drive/16GkXDMPsOoAHAfVWsBcKQzRl7k4T7r6V>

Page title: Test\_HelloWorld.ipynb ☆

Menu: File Edit View Insert Runtime Tools Help

Actions: COMMENT, SHARE,

Cell types: + CODE, + TEXT, ↑ CELL, ↓ CELL

Status: ALLOCATING, EDITING

Code editor: A large text area with a play button icon on the left and a vertical scrollbar on the right.

# GOOGLE COLAB



Browser tabs: Welcome To Colaboratory - Colab x Test\_HelloWorld.ipynb - Colaboratory x

Address bar: <https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V>

Test\_HelloWorld.ipynb ☆

File Edit View Insert Runtime Tools Help

COMMENT SHARE

+ CODE + TEXT ↑ CELL ↓ CELL

✓ RAM Disk EDITING

▶

▶

# GOOGLE COLAB



Browser tabs: Welcome To Colaboratory - Colab x Test\_HelloWorld.ipynb - Colabor x

Address bar: <https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V#scrollTo=KyrHdICc2c3z>

Test\_HelloWorld.ipynb ☆

File Edit View Insert Runtime Tools Help

COMMENT SHARE

+ CODE + TEXT ↑ CELL ↓ CELL

✓ RAM Disk EDITING

```
print("Hello World")
```

# GOOGLE COLAB



The screenshot displays the Google Colab web interface. At the top, the browser address bar shows the URL <https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V#scrollTo=KyrHDlCc2c3z>. The main header includes the Google Colab logo, the file name "Test\_HelloWorld.ipynb", and a star icon. Below the header is a menu bar with options: File, Edit, View, Insert, Runtime, Tools, and Help. A secondary toolbar contains buttons for adding a new CODE cell, TEXT cell, or moving the current cell up or down. On the right side of this toolbar, there are indicators for RAM and Disk usage, a status icon (a green checkmark), and an "EDITING" button. The central workspace features a single code cell containing the Python code `print("Hello World")`. To the left of the code is a circular button with a right-pointing triangle, which is the "Run" button. A red arrow points from the bottom left towards this button. The text "Shift + Enter" is written in red next to the arrow, indicating the keyboard shortcut to execute the code. A vertical ellipsis menu is visible to the right of the code cell.

# GOOGLE COLAB



Browser tabs: Welcome To Colaboratory - Colab x Test\_HelloWorld.ipynb - Colabor x

Address bar: <https://colab.research.google.com/drive/16GkXDMPsOoAHAfVWsBcKQzRl7k4T7r6V#scrollTo=KyrHdICc2c3z>

Test\_HelloWorld.ipynb ☆

File Edit View Insert Runtime Tools Help

+ CODE + TEXT ↑ CELL ↓ CELL

✓ RAM [ ] Disk [ ] EDITING ^

```
▶ print("Hello World")
```

↳ Hello World

# GOOGLE COLAB



Test\_HelloWorld.ipynb ☆

File Edit View Insert Runtime Tools Help

+ CODE + TEXT ↑ CELL ↓ CELL

✓ RAM Disk EDITING

```
print("Hello World")
```

Hello World

A screenshot of the Google Colab web interface. The browser address bar shows the URL 'https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V#scrollTo=KyrHdICc2c3z'. The interface includes a top menu bar with 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. Below the menu is a toolbar with buttons for '+ CODE', '+ TEXT', '↑ CELL', and '↓ CELL'. A red arrow points to the '+ TEXT' button. To the right of the toolbar are indicators for 'RAM' and 'Disk' usage, and an 'EDITING' status. The main workspace contains a single code cell with the text 'print("Hello World")'. Below the code cell, the output 'Hello World' is displayed.

# GOOGLE COLAB



Welcome To Colaboratory - Colab x Test\_HelloWorld.ipynb - Colaboratory x

https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBCKQzRl7k4T7r6V#scrollTo=vS06ZmAY4Fm6

CO

Test\_HelloWorld.ipynb ☆

File Edit View Insert Runtime Tools Help

+ CODE + TEXT ↑ CELL ↓ CELL

✓ RAM Disk EDITING

>

```
[2] print("Hello World")
```

↳ Hello World

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Here are some documentation related with the code.

Here are some documentation related with the code.

Test\_HelloWorld.ipynb

File Edit View Insert Runtime Tools Help

+ CODE + TEXT ↑ CELL ↓ CELL

COMMENT SHARE

RAM Disk EDITING

[2] print("Hello World")  
Hello World

T B I < > 🔗 🖼️ ☰ ⚙️

Here are some documentation related with the code.  
**# First level heading**  
Some text here.  
**## Second level heading**  
Sub-section contents goes here.

Here are some documentation related with the code.  
**First level heading**  
Some text here.  
**Second level heading**  
Sub-section contents goes here.



Test\_HelloWorld.ipynb

File Edit View Insert Runtime Tools Help

+ CODE + TEXT ↑ CELL ↓ CELL

COMMENT SHARE

RAM Disk EDITING

[2] print("Hello World")  
Hello World

T B I <> ↶ ↷ ⌵ ⌴ ⌶ ⌸ ⌹

Here are some documentation related with the code.  
**# First level heading**  
Some text here.  
**## Second level heading**  
Sub-section contents goes here.  
  
We can also typeset mathematical equations similar to LaTeX:  
$$x = \frac{\text{numerator}}{\text{denominator}}$$

Here are some documentation related with the code.  
**First level heading**  
Some text here.  
**Second level heading**  
Sub-section contents goes here.  
  
We can also typeset mathematical equations similar to LaTeX:  
$$x = \frac{\text{numerator}}{\text{denominator}}$$



The screenshot displays the Google Colab web interface. At the top, the browser address bar shows the URL: `https://colab.research.google.com/drive/16GkXDMPsOoAHAfVWsBcKQzRl7k4T7r6V#scrollTo=vS06ZmAY4Fm6`. The notebook title is "Test\_HelloWorld.ipynb". The interface includes a menu bar (File, Edit, View, Insert, Runtime, Tools, Help) and a toolbar with tabs for CODE, TEXT, and CELL. A status bar at the top right shows RAM and Disk usage, and an EDITING mode indicator.

The notebook contains a single code cell with the following content:

```
[2] print("Hello World")
```

Below the code cell, the rendered output is displayed:

Hello World

The output area features a rich text editor with a toolbar containing icons for text formatting (bold, italic, link, unlink, image, list, ordered list, table, etc.). The rendered content is split into two columns by a vertical dashed line:


- Left Column:**
  - Text: "Here are some documentation related with the code."
  - Section: **# First level heading**
  - Text: "Some text here."
  - Section: **## Second level heading**
  - Text: "Sub-section contents goes here."
  - Text: "We can also typeset mathematical equations similar to LaTeX:"
  - Equation: 
$$x = \frac{\text{numerator}}{\text{denominator}}$$
- Right Column:**
  - Text: "Here are some documentation related with the code."
  - Section: **First level heading**
  - Text: "Some text here."
  - Section: **Second level heading**
  - Text: "Sub-section contents goes here."
  - Text: "We can also typeset mathematical equations similar to LaTeX:"
  - Equation: 
$$x = \frac{\text{numerator}}{\text{denominator}}$$

A red text annotation "Shift + Enter" is positioned between the two columns, indicating the keyboard shortcut used to execute the code cell.




Welcome To Colaboratory - Colab x Test\_HelloWorld.ipynb - Colaboratory x

https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBckQzRI7k4T7r6V#scrollTo=vS6ZmAY4Fm6

 Test\_HelloWorld.ipynb ☆

File Edit View Insert Runtime Tools Help

COMMENT SHARE 

+ CODE + TEXT ↑ CELL ↓ CELL

✓ RAM Disk EDITING ^

>

```
[2] print("Hello World")
```

Hello World

Here are some documentation related with the code.

▼ **First level heading**

Some text here.

**Second level heading**

Sub-section contents goes here.

We can also typeset mathematical equations similar to LaTeX:

$$x = \frac{numerator}{denominator}$$

[ ]



Test\_HelloWorld.ipynb - Colaboratory

https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBckQzRl7k4T7r6V#scrollTo=T7eo0k5p5\_13

Test\_HelloWorld.ipynb

File Edit View Insert Runtime Tools Help

COMMENT SHARE

+ CODE + TEXT

↑ CELL ↓ CELL

✓ RAM Disk

EDITING

>

Here are some documentation related with the code.

▼

First level heading

Some text here.

Second level heading

Sub-section contents goes here.

We can also typeset mathematical equations similar to LaTeX:

$$x = \frac{\text{numerator}}{\text{denominator}}$$

▶

```
import numpy as np
import matplotlib.pyplot as plt
```

⋮



Test\_HelloWorld.ipynb - Colaboratory

https://colab.research.google.com/drive/16GkXDMPsOoAHAFVWsBcKQzRl7k4T7r6V#scrollTo=djOt-Pwl8lOs

Test\_HelloWorld.ipynb

File Edit View Insert Runtime Tools Help

COMMENT SHARE

CODE TEXT CELL CELL

RAM Disk EDITING

Here are some documentation related with the code.

## First level heading

Some text here.

## Second level heading

Sub-section contents goes here.

We can also typeset mathematical equations similar to LaTeX:


$$x = \frac{numerator}{denominator}$$

```
[4] import numpy as np
import matplotlib.pyplot as plt
```




# GPU RUNTIME SETTINGS



 GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

 Comment

 Share



+ Code + Text

Connect ▼

 Editing





GPU\_Runtime.ipynb ☆

File Edit View Insert **Runtime** Tools Help

 Comment

 Share



+ Code + Text

Connect ▾

 Editing







GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

Comment

Share



+ Code + Text

Connect ▾

Editing



Run all Ctrl+F9  
Run before Ctrl+F8  
Run the focused cell Ctrl+Enter  
Run selection Ctrl+Shift+Enter  
Run after Ctrl+F10

Interrupt execution Ctrl+M I

Restart runtime... Ctrl+M .

Restart and run all...

Reset all runtimes...

Change runtime type

Manage sessions

View runtime logs



GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

Comment

Share



+ Code + Text

Connect

Editing



Run all Ctrl+F9

Run before Ctrl+F8

Run the focused cell Ctrl+Enter

Run selection Ctrl+Shift+Enter

Run after Ctrl+F10

Interrupt execution Ctrl+M |

Restart runtime... Ctrl+M .

Restart and run all...

Reset all runtimes...

Change runtime type

Manage sessions

View runtime logs



GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

+ Code + Text

Comment Share

Connect Editing

### Notebook settings

Runtime type  
Python 3

Hardware accelerator  
None

☐ Omit code cell output when saving this notebook

CANCEL SAVE



GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

+ Code + Text

Comment Share

Connect Editing

### Notebook settings

Runtime type  
Python 3

Hardware accelerator  
None

☐ Omit code cell output

None GPU TPU

Cancel Save



GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

+ Code + Text

Comment Share

Connect Editing

### Notebook settings

Runtime type  
Python 3

Hardware accelerator  
None


☐ Omit code cell output from this notebook

None ?

GPU

TPU CANCEL SAVE



 GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

Comment Share

+ Code + Text

Connect Editing

↑ ↓ ↻ ⌨ ⚙️ 🗑️ ⋮

### Notebook settings


Runtime type  
Python 3

Hardware accelerator  
GPU

☐ Omit code cell output when saving this notebook

CANCEL SAVE



 GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

 Comment

 Share



+ Code + Text

Connect ▼

 Editing





 GPU\_Runtime.ipynb ☆

File Edit View Insert Runtime Tools Help

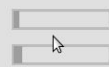
 Comment

 Share



+ Code + Text

✓ RAM  
Disk



 Editing



Connected to "Python 3 Google Compute Engine backend (GPU)"

RAM: 0.80 GB/12.72 GB Disk: 30.47 GB/358.27 GB





# UPLOADING FILES



uploadFiles.ipynb ☆

File Edit View Insert Runtime Tools Help

Comment

Share



+ Code + Text

Connect ▾

Editing





uploadFiles.ipynb ☆

File Edit View Insert Runtime Tools Help

Comment

Share




+ Code + Text

Connect ▾

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 uploadFiles.ipynb ☆

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+ Code + Text

Connect Editing

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Filter code snippets

Adding form fields →

Camera Capture →

Cross-output communication →

display.Javascript to execute JavaScript f... →

Downloading files or importing data from... →

Downloading files to your local file system →

Evaluate a Javascript expression from Py... →

Adding form fields INSERT

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# GOOGLE COLAB



uploadFiles.ipynb ☆

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+ Code + Text

✓ RAM  
Disk

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Code snippets

**Files**

⬆️ **UPLOAD** ↻ REFRESH 🗳️ MOUNT DRIVE



sample\_data

Disk 23.45 GB available



The screenshot displays the Google Colab web interface. At the top, the title bar shows the Colab logo, the file name 'uploadFiles.ipynb', and a star icon. Below this is a menu bar with options: File, Edit, View, Insert, Runtime, Tools, and Help. On the right side of the title bar are icons for Comment, Share, and a small tree icon. The main interface area has a top bar with '+ Code' and '+ Text' buttons. To the right of these buttons are RAM and Disk usage indicators, a green checkmark, and an 'Editing' button. The left sidebar contains a 'Table of contents' section with tabs for 'Table of contents', 'Code snippets', and 'Files'. Under the 'Files' tab, there are buttons for 'UPLOAD', 'REFRESH', and 'MOUNT DRIVE'. Below these buttons, a file tree shows a folder named 'sample\_data' and a file named 'imgOCV.zip'. A central dialog box is overlaid on the interface, containing the text: 'Reminder, uploaded files will get deleted when this runtime is recycled.' followed by a blue link labeled 'More info'. At the bottom right of the dialog box is a blue 'OK' button. The bottom status bar shows 'Disk' usage and '23.45 GB available'.

uploadFiles.ipynb ☆

File Edit View Insert Runtime Tools Help

+ Code + Text

RAM ✓ Disk

Editing

Table of contents Code snippets Files X

UPLOAD REFRESH MOUNT DRIVE

..

sample\_data

imgOCV.zip

Reminder, uploaded files will get deleted when this runtime is recycled.  
[More info](#)

OK

Disk 23.45 GB available

# GOOGLE COLAB



uploadFiles.ipynb ☆

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+ Code + Text

✓ RAM  
Disk

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↑ UPLOAD ↻ REFRESH 🗳 MOUNT DRIVE




sample\_data

imgOCV.zip



Disk 23.45 GB available



 uploadFiles.ipynb ☆

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Comment Share

RAM  Disk  Editing

+ Code + Text

Table of contents Code snippets **Files** ✕

⬆️ UPLOAD ↻ REFRESH 🗳️ MOUNT DRIVE

📁 ..

▶️ 📁 sample\_data

📄 imgOCV.zip

▶️ !unzip imgOCV.zip

Disk  23.45 GB available





uploadFiles.ipynb ☆

File Edit View Insert Runtime Tools Help

Comment

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+ Code + Text

✓ RAM  
Disk

Editing

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⬆️ UPLOAD ↻ REFRESH 🗳️ MOUNT DRIVE



..

▶️ folder imgOCV

▶️ folder sample\_data



imgOCV.zip

```
[1] !unzip imgOCV.zip
```

```
📁 Archive: imgOCV.zip
   creating: imgOCV/
  inflating: imgOCV/bird.jpg
  inflating: imgOCV/forest.jpg
  inflating: imgOCV/fruit.jpg
```



Disk 23.45 GB available



uploadFiles.ipynb ☆

File Edit View Insert Runtime Tools Help

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+ Code + Text

✓ RAM  
Disk

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⬆️ UPLOAD ↻ REFRESH

MOUNT DRIVE



..

▶️ img0CV

▶️ sample\_data

img0CV.zip

```
[1] !unzip img0CV.zip
```

```
📁 Archive: img0CV.zip
   creating: img0CV/
  inflating: img0CV/bird.jpg
  inflating: img0CV/forest.jpg
  inflating: img0CV/fruit.jpg
```



Disk 23.45 GB available